IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:		§	
		§	
	Yechiel COHEN	§	
		§	
Serial No.:	Not Yet Known	§	
		§	
Filed:	Concurrently	§	Group Art Unit:
		§	
For:	Dental Handpiece, Torque Applying Tool For Use Therewith And Dental Kit Including Same	§	Attorney Docket: 27438
		§	
Examiner:		§	

Commissioner for Patents
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Alexandria, VA 22313-1450

CLAIM OF PRIORITY RIGHTS

Sir:

Applicant hereby perfects the claimed priority date of Israel Patent Application No. 154561 filed February 20, 2003, and encloses herewith a certified copy of that Israel Patent Application to support the claim for its priority date.

Respectfully submitted,

Sol Sheinbein
Registration No. 25,457

Date: February 17, 2004

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This 03-02-2004 היום

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חוק הפטנטים, תשכ"ז - 1967
PATENT LAW, 5727-1967

לשימוש הלשכה
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מספר: Number	154561
תאריך: Date	20 -02- 2003
הוקדם/נדחה Ante/Post-dated	

בקשה לפטנט
Application for Patent

אני, (שם המבקש, מענו ולגבי גוף מאוגד - מקום התאגדותו)
:(Name and address of applicant, and in case of body corporate - place of incorporation)

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בעל אמצאה מכח הדין
Owner, by virtue of

By Law ששמו הוא
of an invention the title of which is

(בעברית)
(Hebrew)

מברג לרפואת שיניים

(באנגלית)
(English)

DENTAL SCREWDRIVER

מבקש בזאת כי ינתן לי עליה פטנט
hereby apply for a patent to be granted to me in respect thereof.

בקשת חלוקה Application of Division	בקשת פטנט מוסף Application for Patent Addition	דרישה דין קדימה Priority Claim		
מבקשת פטנט from Application	לבקשה/לפטנט to Patent/Appl.	מספר/סימן Number/Mark	תאריך Date	מדינת האגוד Convention Country
No. מס'	No. מס'			
dated מיום	dated מיום			

יפוי כח: כללי ~~XXXXX~~ - רצוף בזה /~~XXXXXXX~~
P.O.A.: general ~~XXXXXX~~-attached/~~to be filed later~~

filed in case הוגש בענין

המען למסירת מסמכים בישראל
Address for Service in Israel

126/03

זליגסון גבריאלי לויט ושות'
ת.ד. 1426
תל-אביב 61013

חתימת המבקש
Signature of Applicant

היום 20 בחודש פברואר שנת 2003
This of of the year

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This form, impressed with the Seal of the Patent Office and indicating the number and date of filing, certifies the filing of the application the particulars of which are set out above.

מברג לרפואת שיניים

DENTAL SCREWDRIVER

FIELD OF THE INVENTION

The present invention relates to tools for oral medicine in general and for dentistry and orthodontics in particular.

BACKGROUND OF THE INVENTION

For prosthetics, braces and other mechanical devices fixed permanently or temporarily within the mouth of a patient, by a dentist, oral surgeon, orthodontist, oral hygenist or other, henceforth the operator. frequently have to adjust, screw up, unscrew or otherwise adjust threaded fixing devices such as screws and bolts within the oral cavity of a patient. These threaded fixing devices have, until now, been screwed and unscrewed using hand-held allen keys, screw drivers, or spanners, which require being attached to the head of the fixing device, and rotated manually by hand. Such tools are awkward to use, particularly where the screw head is in a difficult to reach position.

An additional problem of known tools for screwing and unscrewing threaded fixing devices is that the torque applied via such tools is applied directly by the operator. It will be appreciated that damage, sometimes irreparable damage, can be caused to the threaded fixing device, and / or to the tooth, and / or to the brace or to the prosthetic by applying an excessive torque. There is thus a need for a more convenient, ergonomical dental tool, and the present invention is directed to supplying such a tool.

SUMMARY OF THE INVENTION

It is an aim of the invention to provide a more convenient means for tightening, loosening, unscrewing and screwing up threaded fixing devices within the oral cavity of a patient.

According in a first aspect of the invention there is provided a tool for applying a torque to a threaded fixing device having a head, the tool comprising: a casing having a handle part and a neck; a rotating means; a driving tool bit for engaging the head of the fixing device; a transmission system for transmitting a torque from the rotating means to the driving tool bit, and an overload coupling for preventing the torque applied to the threaded fixing device from exceeding a maximum.

Preferably, the handle part fits comfortably into a hand of an operator.

Preferably, the handle part is angled to said neck part.

Typically the driving tool bit has a shaft and a head engaging part, and said shaft is angled to said handle of the tool.

Optionally, the rotating means is a manual rotating means.

Alternatively the rotating means is an electric rotating means comprising a motor and a gear system. The electric rotating means may include an internal power source comprising a chemical cell. In other embodiments, the electric rotating means is coupled to an external power supply, such as a plug-in control unit for a dental chair, for example.

In yet other embodiments, the motor is coupled to a power source and the motor and the power source are external to the hand-held tool, the motor being coupled to the hand-held tool via a flexible drive shaft.

Preferably the tool further comprises an internal illumination system. This may include a light emitter and an optical fiber for transmitting light from the light emitter to the driving tool bit.

In another aspect of the invention there is provided an adaptor for coupling onto a universal tool, to adapt the universal tool into a tool for rotating threaded screw devices, the adaptor comprising a driving tool bit for engaging the head of the fixing device and a transmission system for transmitting a torque from the universal tool to the driving tool bit, and an overload coupling for preventing the torque applied to the threaded fixing device from exceeding a maximum.

The overload coupling typically includes a spring such as a bellevielle spring washer.

The driving tool bit may be magnetized.

Preferably the maximum torque applied is variable over a user-settable range. Most preferably, the range is below 25 N-cm.

Optionally, the overload coupling is selected from the list of torsion bars, switches, slip-rings and ratchet heads.

In a third aspect fo the invention, there is provided a method of rotating a fixing device having a head, within the oral cavity using the tool of claim 1 consisting engaging the head of the fixing device with the driving tool bit and transmitting a non-excessive torque to the threaded fixing device.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be further understood and appreciated from the following detailed description taken in conjunction with the drawings in which:

Fig. 1 is a cross-sectional view of a first embodiment of the present invention, being a hand held tool for applying a torque to a threaded fixing device having a means of preventing the torque from exceeding a maximum torque.

Fig. 2 is a detail showing the head of the hand held tool of Fig. 1.

Fig. 3 is a top view of the butt end of the device of Fig. 1.

Fig. 4 is a cross-sectional view of a butt end of the hand held tool, in accordance with a second embodiment.

Fig. 5 is a cross-sectional view of a third embodiment of the present invention being an adaptor for converting a hand-held low-speed dental tool, such as a universal hand-held low speed dental tool, into a hand held tool for applying a torque to a threaded fixing device having a means of preventing the torque from exceeding a maximum torque, that includes a bellevielle spring washer.

Fig. 6 is a cross-sectional view of a fourth embodiment of the present invention being another adaptor for converting a hand-held low-speed dental tool, such as a universal hand-held low speed dental tool, into a hand held tool for applying a torque to a threaded fixing device having a means of preventing the torque from exceeding a maximum torque that includes a compression spring.

Fig. 7 is a manually operated hand-held tool of the present invention, having a means of preventing the torque from exceeding a maximum torque.

Fig. 8 is a cross-sectional view of a preferred embodiment of the invention including the attractive feature of an integral illumination means for illuminating the tool head.

Fig. 9 is a schematic view of yet another embodiment for the invention being a hand-held tool having an external motor coupled thereto via a flexible driveshaft.

Fig. 10 shows a variant means of adjusting the tool coupling.

DETAILED DESCRIPTION OF THE INVENTION

Fig. 1 is a cross-sectional view of a first embodiment of the present invention, being a hand held tool for applying a torque to a threaded fixing device having a means of preventing the torque from exceeding a maximum torque.

Fig. 2 is a detail showing the head of the hand held tool of Fig. 1.

Fig. 3 is a top view of the butt end of the device of Fig. 1.

Fig. 4 is a cross-sectional view of a butt end of the hand held tool, in accordance with a second embodiment.

Fig. 5 is a cross-sectional view of a third embodiment of the present invention being an adaptor for converting a hand-held low-speed dental tool, such as a universal hand-held low speed dental tool, into a hand held tool for applying a torque to a threaded fixing device having a means of preventing the torque from exceeding a maximum torque, that includes a bellevielle spring washer.

Fig. 6 is a cross-sectional view of a fourth embodiment of the present invention being another adaptor for converting a hand-held low-speed dental tool, such as a universal hand-held low speed dental tool, into a hand held tool for applying a torque to a threaded fixing device having a means of preventing the torque from exceeding a maximum torque that includes a compression spring.

Fig. 7 is a manually operated hand-held tool of the present invention, having a means of preventing the torque from exceeding a maximum torque.

Fig. 8 is a cross-sectional view of a preferred embodiment of the invention including the attractive feature of an integral illumination means for illuminating the tool head.

Fig. 9 is a schematic view of yet another embodiment fo the invention being a hand-held tool having an external motor coupled thereto via a flexible driveshaft.

Fig. 10 shows a variant means of adjusting the tool coupling.

It will be appreciated that the invention is not limited to what has been described hereinabove merely by way of example. Rather, the invention is limited solely by the claims which follow.

CLAIMS

1. A tool for applying a torque to a threaded fixing device having a head, such tool comprising:
   a casing having a handle part and a neck;
   a rotating means;
   a driving tool bit for engaging the head of the fixing device;
   and a transmission system for transmitting a torque from the rotating means to the driving tool bit, and
   an overload coupling for preventing the torque applied to the threaded fixing device from exceeding a maximum.
2. A tool as in claim 1, wherein said handle part fits comfortably into a hand of an operator.
3. A tool as in claim 1, wherein said handle part is angled to said neck part.
4. A tool as in claim 1, wherein said driving tool bit has a shaft and a head engaging part, and said shaft is angled to said handle of the tool.
5. A tool as in claim 1 wherein said rotating means is a manual rotating means.
6. A tool as in claim 1 wherein said rotating means is an electric rotating means comprising a motor and a gear system.
7. A tool as in claim 6 further comprising an internal power source comprising a chemical cell.
8. A tool as in claim 6 coupled to an external power supply.
9. A tool as in claim 8 wherein said external power supply is a plug in control unit for a dental chair.
10. A tool as in claim 6 wherein said motor is coupled to a power source and said motor and said power source are external to said hand-held tool, said motor being coupled to said hand-held tool via a flexible drive shaft.
11. A tool as in any of the above further comprising an internal illumination system.

12. A tool as in claim 11 wherein said illumination system includes a light emitter and an optical fiber for transmitting light from said light emitter to said driving tool bit.

13. An adaptor for coupling onto a universal tool, to adapt said universal tool into a tool for rotating threaded screw devices, said adaptor comprising a driving tool bit for engaging the head of the fixing device
and a transmission system for transmitting a torque from the universal tool to the driving tool bit, and an overload coupling for preventing the torque applied to the threaded fixing device from exceeding a maximum.

14. An adaptor as in claim 11, wherein the overload coupling includes a spring, such as a bellevielle spring washer.

15. A tool as in any of the above wherein the driving tool bit is magnetized.

16. A tool as in any of the above wherein said maximum is variable over a settable range.

17. A tool as in claim 16 wherein said range is below 25 N-cm.

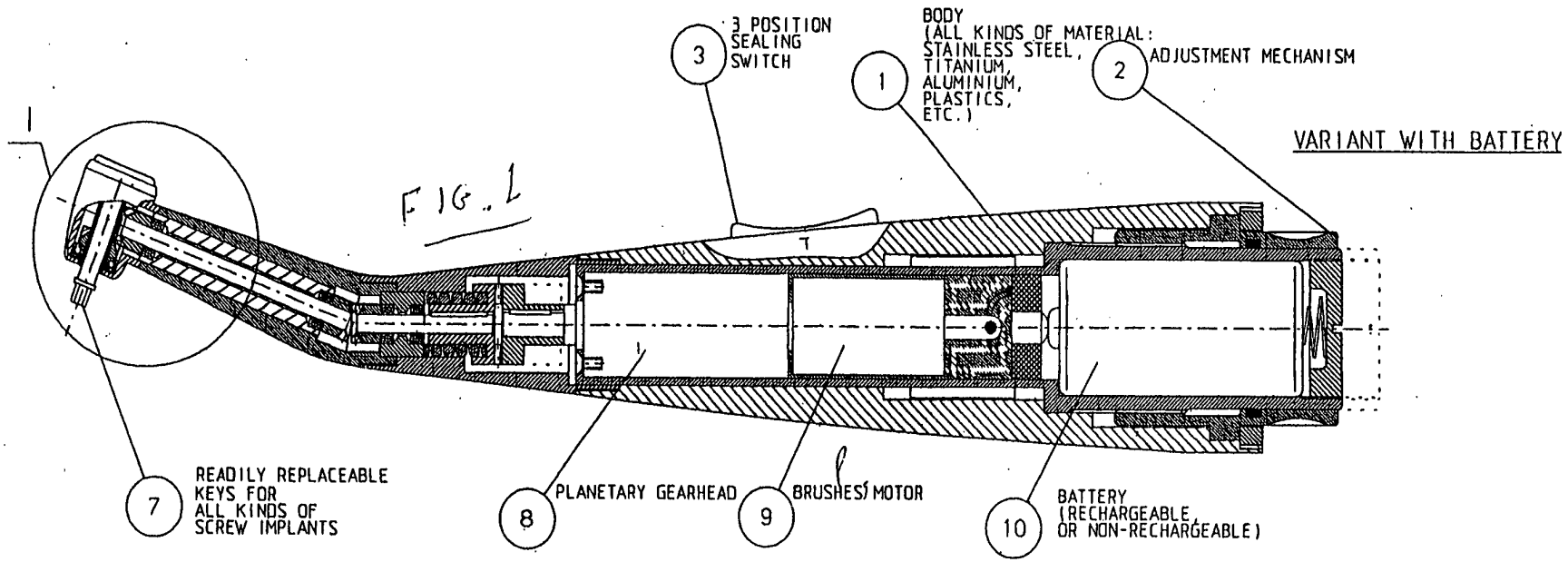
18. A tool as in any of the above wherein said overload coupling is selected from the list of torsion bars, switches, slip-rings and ratchet heads.

19. A method of rotating a fixing device having a head, within the oral cavity using the tool of claim 1 consisting engaging the head of the fixing device with the driving tool bit and transmitting a non-excessive torque to the threaded fixing device.

AGENT FOR APPLICANT

DENTAL AUTOSCREWDRIVER

(MULTIPLY APPLICATION IN ALL INDUSTRIES)



VARIANT WITH BATTERY

FIG. 1

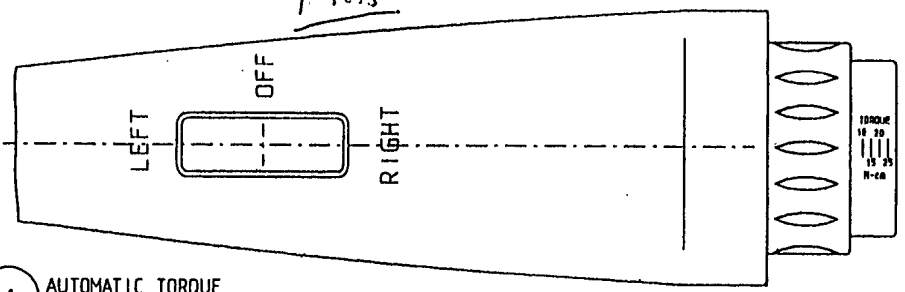


FIG. 3

DETAIL I

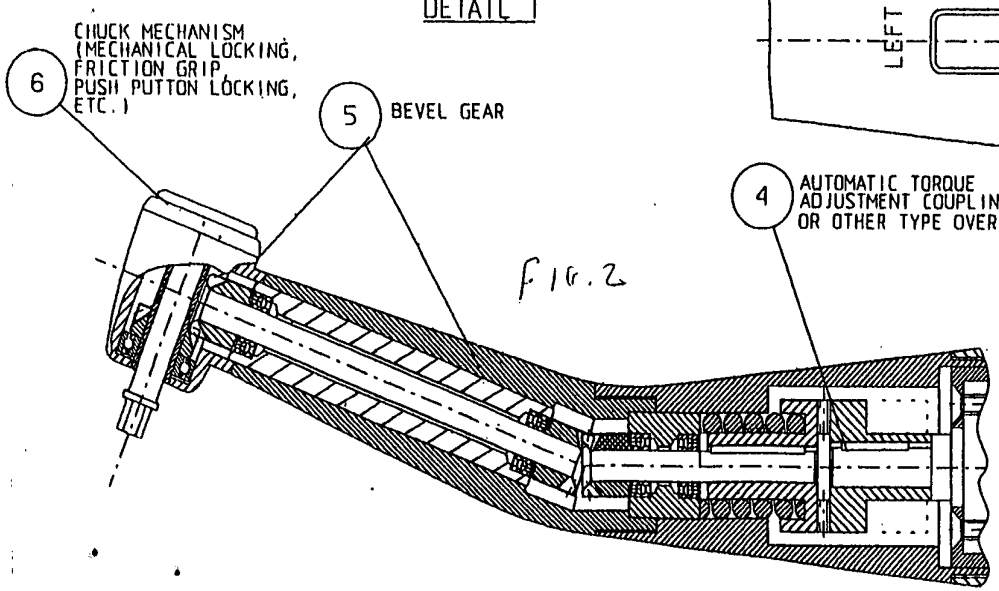
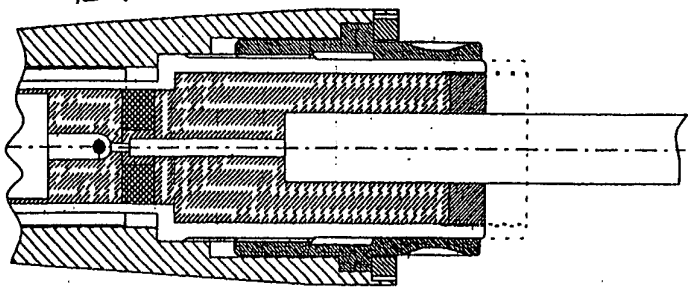


FIG. 2

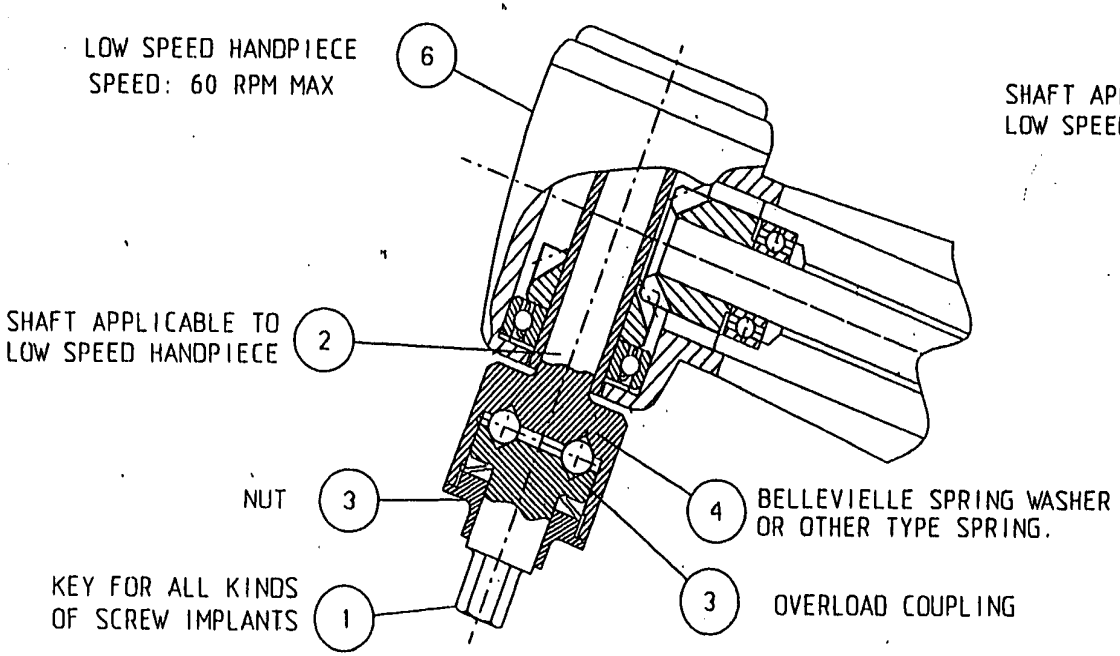


VARIANT WITH OTHER ELECTRICAL SOURCE (DENTAL CHAIR, PLUG-IN CONTROL UNIT)

Fig. 4

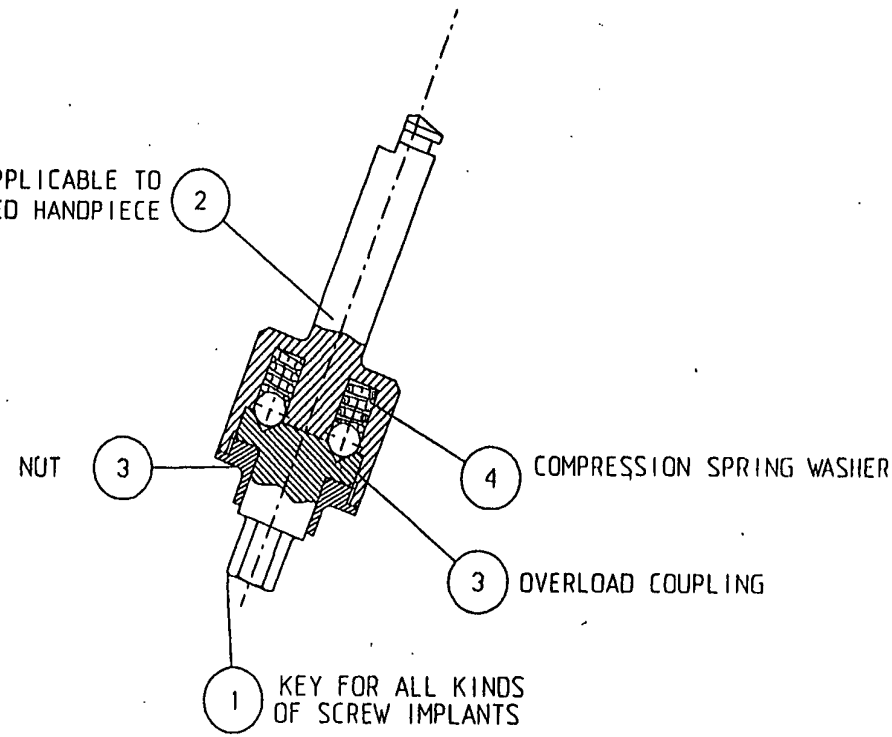
FIG. 4

KEY FOR DENTAL IMPLANTS
(MULTIPLY APPLICATION IN ALL INDUSTRIES)



VARIANT WITH
BELLEVIELLE SPRING WASHER

FIG 5



VARIANT WITH
COMPRESSION SPREING

FIG. 6

DENTAL SCREWDRIVER MANUALY BY HAND

(MULTIPLY APPLICATION IN ALL INDUSTRIES)

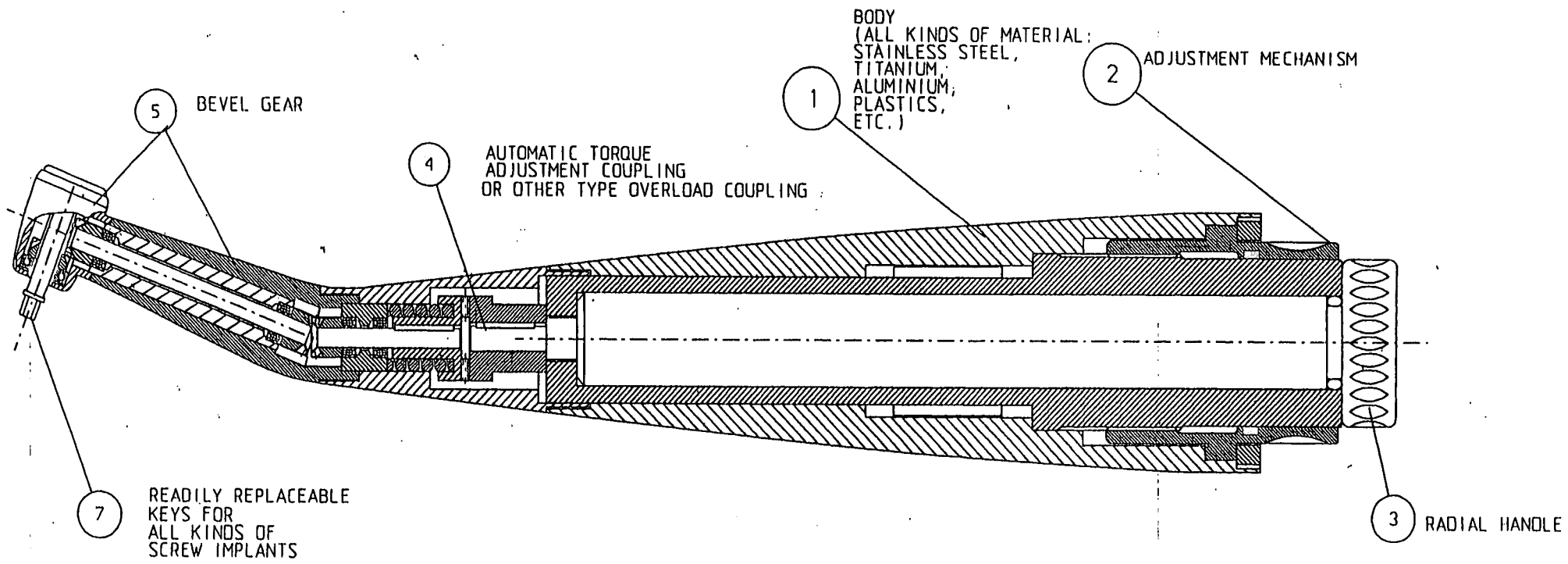
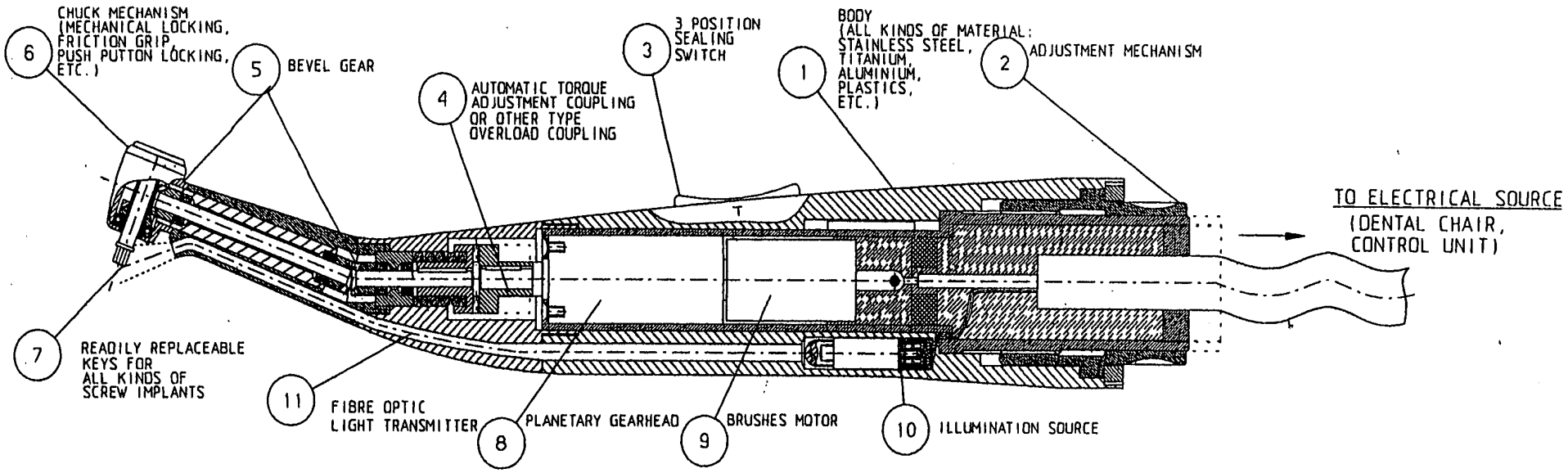


FIG 3

DENTAL AUTOSCREWDRIVER
WITH OUTER ELECTRICAL SOURCE
AND FIBRE OPTIC ILLUMINATION

(MULTIPLY APPLICATION IN ALL INDUSTRIES)



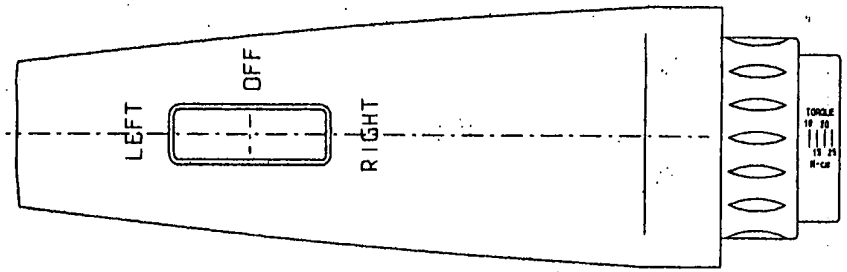


FIG 4

DENTAL SCREWDRIVER WITH FLEXIBLE TRANSMISSION SYSTEM

FULL AUTOCLAVABLE SCREWDRIVER

(MULTIPLY APPLICATION IN ALL INDUSTRIES)

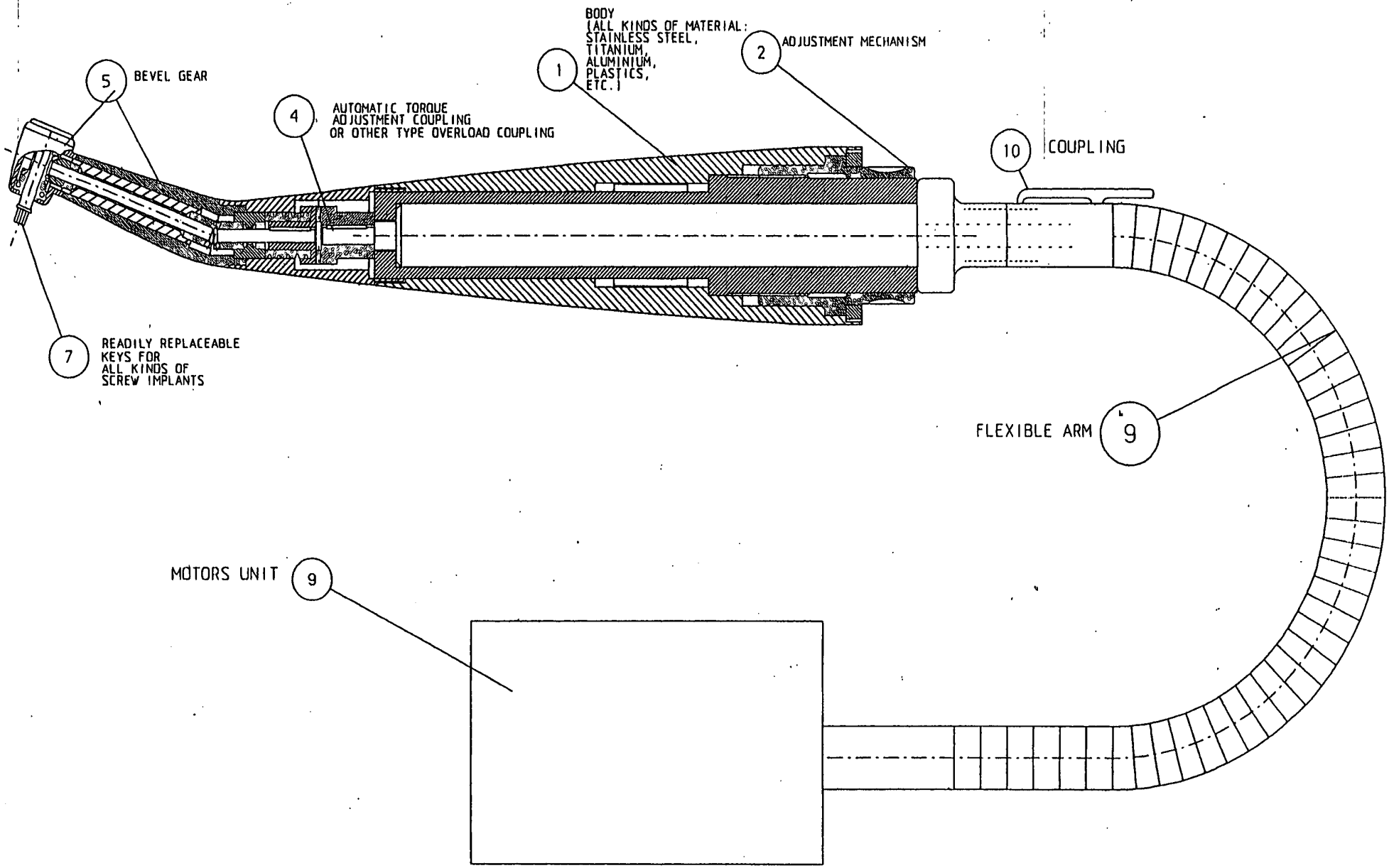


FIG 9

ALTERNATIVE VARIANT FOR ADGJUSTMENT TORQUE COUPLING

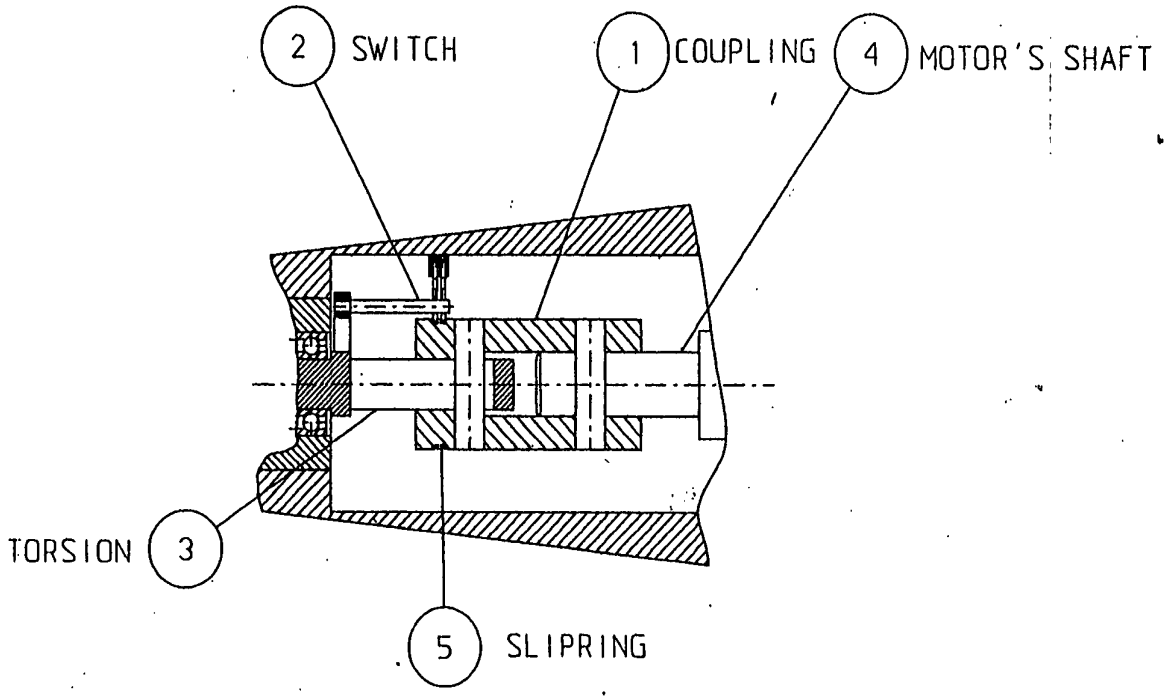


FIG 10